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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/077,569	02/15/2002	Chun-Hua Chen	227	3238

7590 09/23/2004

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EXAMINER	
WILLS, MONIQUE M	

ART UNIT	PAPER NUMBER
1746	

DATE MAILED: 09/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/077,569	CHEN ET AL.	
	Examiner	Art Unit	
	Monique M Wills	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,11-23 and 26-32* is/are rejected.

7)☒ Claim(s) *9,10,24 and 25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *2/15/2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This Office Action is responsive to the Amendment filed July 15, 2004.

The following actions are overcome:

- The objection to claim 1, to separate "vinyl ethylene carbonate" and "vinyl quinone".
- The obje4ction to claim 24, under 37 CFR 1.75(c), for failing to further limit the subject matter of a previous claim.
- The rejection of claims 1-32 under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement.
- The rejection of claim 12 under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement.
- The rejection of claim 25 under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement.
- The rejection of claim 27 under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement.
- The rejection of claims 2-29 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The following actions are maintained:

- Claims 9,10,24 & 25 remain objected as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
- The rejection of claims 1,2,22,29,31 & 32 under 35 U.S.C. §103(a) as being unpatentable over Olsen et al., U.S. Patent 5,455,127, in view of Kotado et al. JP 2001-006729.
- The rejection of claims 1, 3-8,11,15,23,28,30,31 & 32 under 35 U.S.C. §103(a) as being unpatentable over Gan et al., U.S. Patent 6,068,950, in view of Kotado et al. JP 2001-006729.
- The rejection of claims 14 & 16-17 under 35 U.S.C. §103(a) as being unpatentable over Gan et al., U.S. Patent 6,068,950, in view of Kotado et al. JP 2001-006729 as applied to claim 1, and further in view of Sekino et al., U.S. Pub. 2002/0164531.
- The rejection of claims 12 & 18-21 under 35 U.S.C. §103(a) as being unpatentable over Olsen et al., U.S. Patent 5,455,127, in view of Kotado et al. JP 2001-006729 as applied to claim 1, in view of McMillan et al., U.S. Patent 6,506,524.
- The rejection of claim 26 under 35 U.S.C. §103(a) as being unpatentable over Gan et al., U.S. Patent 6,068,950, in view of Kotado et al. JP 2001-006729 as applied to claim 1, and further in view of Tobishima JP 358214281.

A brief reiteration is recited below.

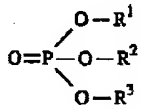
Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 22, 29, 31 & 32 are rejected under 35 U.S.C. §103(a) as being unpatentable over Olsen et al., U.S. Patent 5,455,127, in view of Kotado et al. JP 2001-006729.

Olsen is directed to a solid electrolyte containing a polymeric matrix, salt, solvent, viscosifying agent and flame retardant (abstract). With respect to claim 1, the lithium secondary battery comprises: a lithium insertion compound cathode (col. 7, lines 8-15); a negative electrode of lithium or lithium alloy (col. 7, lines 1-6); a lithium salt dissolved in an electrolyte solvent (col. 6, lines 1-20); and a flame retardant comprising a phenyl alkyl phosphate of the formula:



wherein each f R^1, R^2 and R^3 is one an organic aliphatic compound for example CH_3, C_2H_5, C_3H_7, C_4H_9, C_5H_{11} and the like, and an aromatic compound, for example C_5H_5, and the like. Suitable flame retardant compounds include trimethyl phosphate, triethyl phosphate, triphenyl phosphate, 2-ethylhexyl diphenyl phosphate, trimethylene phosphate, and the like. See col. 6, lines 50-68. With respect to claim 2, 4,4-diethyl-1,3-dioxolan-2-one may be added to the electrolyte (col. 6, lines 10-20). With respect to claims 22 & 29, the electrolyte may contain

10 to 40 percent by weight of the flame retardant (col. 8, lines 38-42). In re claim 31, the lithium salt is selected from lithium hexafluorophosphate, lithium tetrafluoroborate, lithium hexafluoroarsenate and lithium perchlorate (col. 6, lines 1-5). Regarding claim 32, the cathode material includes lithium manganese oxide (col. 7, lines 13-16).

Olsen is silent to an anode passivation additive such as vinyl ethylene carbonate.

Kotada teaches that it is conventional to employ vinyl ethylene carbonate electrolyte solvents to minimize decomposition of the electrolyte, provide high capacity and maintain excellent storage and cycle characteristics at high temperatures (abstract).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the instant invention was made, because even though Olsen does not each vinyl ethylene carbonate additives, Kotado teaches that vinyl ethylene carbonate minimizes decomposition of the electrolyte, provides high capacity and maintains excellent storage and cycle characteristics at high temperatures.

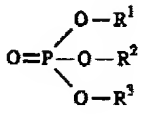
Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3-8, 11, 15, 23, 28, 30, 31 & 32 are rejected under 35 U.S.C. §103(a) as being unpatentable over Gan et al., U.S. Patent 6,068,950, in view of Kotado et al. JP 2001-006729.

Gan is directed to an alkali metal electrochemical cell comprising at least one phosphate additive (abstract). With respect to claim 1, the electrochemical cell comprises: a lithium insertion compound cathode (col. 5, lines 13-18); a negative electrode of lithium or lithium alloy (col.4, lines 1-6); a lithium salt dissolved in an electrolyte solvent (col. 6, lines 20-40); and a flame retardant comprising a phenyl alkyl phosphate of the formula:



wherein each of R^1, R^2 and R^3 are not hydrogen, at least one of them is $CR^1R^2R^3$ where at least R is an aromatic substituent (col. 6, liens 45-50). With respect to claim 30, the electrolyte solvent includes a mixture of propylene carbonate and dimethyl carbonate (col. 6, lines 20-30). In re claim 31, the lithium salt is selected from lithium hexafluorophosphate, lithium tetrafluorborate, lithium hexafluorarsenate and lithium perchlorate (col. 6, lines 35-40). Regarding claim 32, the cathode material includes lithium nickel oxide (col. 5, lines 13-16). Various mixture of the organo-phosphate are used as additives in the electrolyte (col. 6, lines 60-68).

Gan is silent to an anode passivation additive such as vinyl ethylene carbonate (claim 1) and pairing specific phosphate compounds (3-8,11,15,23 & 28).

Kotada teaches that it is conventional to employ vinyl ethylene carbonate electrolyte solvents to minimize decomposition of the electrolyte, provide high capacity and maintain excellent storage and cycle characteristics at high temperatures (abstract).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the instant invention was made, because even though Gan does not each vinyl ethylene carbonate additives, Kotado teaches that vinyl ethylene carbonate minimizes decomposition of the electrolyte, provides high capacity and maintains excellent storage and cycle characteristics at high temperatures.

With respect to claims 3-8, 11, 15,23 & 28, pairing specific phenyl phosphate compounds, the skilled artisan would be motivated to pick and choose a combination of various compounds, because the general formula of the alkyl phosphate embraces the combinations necessitated by the claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 14 & 16-17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Gan et al., U.S. Patent 6,068,950, in view of Kotado et al. JP 2001-006729006729 as applied to claim 1, and further in view of Tobishima JP 358214281.

Gan in view of Kotado teach an organic phosphate additive for non-aqueous electrolytes as described hereinabove. Specifically, Gan teaches the use of an ethyl methyl carbonate electrolyte solvent (col. 6, lines 20-25).

Gan is silent to vinyl ethylene sulfite (claim 14) and a monophenyl carbonate, such as monphenyl ethylene carbonate (claims 16-17).

Sekino teaches the equivalence of ethyl methyl carbonate, vinyl ethylene sulfite and monophenyl ethylene carbonate (¶ 131-133).

The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because even though Gan does not teach vinyl ethylene sulfite or monophenyl ethylene carbonate electrolyte solvents, Sekino teaches that ethyl methyl carbonate, monophenyl carbonate and vinyl ethylene sulfite are equivalent electrolyte solvents for lithium cells.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 12 & 18-21 are rejected under 35 U.S.C. §103(a) as being unpatentable over Olsen et al., U.S. Patent 5,455,127, in view of Kotado et al. JP 2001-006729 as applied to claim 1, in view of McMillan et al., U.S. Patent 6,506,524.

Olsen in view of Kotado teaches an organic phosphate additive for non-aqueous electrolytes as described hereinabove. Specifically, with respect to claims 12 & 18-21, Olsen teaches an organic phosphate additive as a flame retardant in electrolytes (col. 6, lines 60-65). The flame retardant embraces triphenyl phosphate (claims 12, 18 & 21), monobutyl-diphenyl phosphate (claim 19) and tripropyl phosphate (claim 20). See column 6, lines 50-68. The electrolyte may further comprise propylene carbonate (col. 11, lines 1-10).

Olsen is silent to an electrolyte additive comprising: monofluorethylene carbonate (claim 12); 1,2-difluoroethylene carbonate (claims 18-19); and monofluorovinyl ethylene carbonate (claims 20-21). The reference is also silent to fluoroethylene carbonate and triphenyl phosphate being present up to about 3 wt% pf the electrolyte (claim 12).

McMillan teaches that it is conventional to employ fluorinated ethylene carbonate (col. 11, lines 24-25) solvents in conventional electrolytes to increase stabilization of the passivation film, reduce consumption of the electrolyte and increase cell capacity (abstract).

The invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because even though Olsen does not teaches fluorinated ethylene carbonate compounds in the electrolyte, McMillan teaches that fluorinated ethylene carbonate increases stabilization of the passivation film reduced consumption of the electrolyte and increases cell capacity.

With respect to the fluoroethylene carbonate and triphenyl phosphate being present up to about 3wt% of the electrolyte, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ fluroethylene carbonate and triphenyl phosphate in an amount of 3wt%, since it has been held that discovering optimum value of a result effective variable involves only routing skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). The skilled artisan recognizes the addition of fluoroethylene carbonate

directly effects stability of the passivation film. The skilled artisan recognizes the addition of triphenyl phosphate directly effects the flame retardant ability of the electrolyte.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 26 is rejected under 35 U.S.C. §103(a) as being unpatentable over Gan et al., U.S. Patent 6,068,950, in view of Kotado et al. JP 2001-006729 as applied to claim 1, and further in view of Tobishima JP 358214281.

Gan in view of Kotado teach an organic phosphate additive for non-aqueous electrolytes as described hereinabove. Specifically, Gan teaches tripropyl phosphate flame retardant additives in electrolytes.

Gan is silent to a 9-fluorenone electrolyte additive.

Tobishima teaches that additives such as 2,4,7-trinitro-9-fluorenone in electrolytes increases charge/discharge performance in lithium batteries (abstract).

Gan and Tobishima are analogous art because they are from the same field of endeavor namely, fabricating lithium electrochemical ells.

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the instant inve4ntionw as made, because even though Gan does not teach a

9-fluorenone electrolyte additive, Tobishima teaches that additives such as 2,4,7-trinitro-9-fluorenone increase charge/discharge performance in lithium batteries.

Response to Arguments

Applicant asserts that all of the rejections under 35 U.S.C. §103(a) , over various combinations of the Olsen '127, Kotado JP '729, Gan '950 and Sekino '531 references are improper because none of the instant references contemplate the significant improvement in the safety of electrochemical cells by adding a blend of two additives that don't markedly affect the cell thermal safety when used alone. Specifically, unexpected results, such as the free radicals formed by the vinyl ethylene carbonate interacting with organic phosphates to significantly reduce the battery gas generation by an order of magnitude and improve the abuse tolerance of the cell at the high temperature by an order of magnitude, is not contemplated by the references. This argument is not persuasive for two reasons. First, in order to establish unexpected results, the applicant must submit an affidavit or declaration of probative vale to establish said results. Arguments of counsel cannot take the place of evidence in the record. In re Schulze,346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965). Second, "It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art." In re Kerkhoven, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980) (citations omitted) (Claims to a process of preparing a spray-dried

detergent by mixing together two conventional spray-dried detergents were held to be prima facie obvious.). Therefore, because vinyl ethylene carbonate is a very well known electrolyte solvent, it would have been obvious to mix this solvent with other well known electrolyte additives as illustrated above. Kotada specifically teaches that it is conventional to employ vinyl ethylene carbonate electrolyte solvents to minimize decomposition of the electrolyte, provide high capacity and maintain excellent storage and cycle characteristics at high temperatures (abstract). Therefore, the skilled artisan would be motivated to modify the electrolytes of both Gan and Olsen by adding vinyl ethylene carbonate.

As to the assertion of hindsight, Applicants may argue that the examiner's conclusion of obviousness is based on improper hindsight reasoning. However, "[a]ny judgment on obviousness is in a sense necessarily a reconstruction based on hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper." In re McLaughlin 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Michael Barr, may be reached at 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov.Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MW

09/20/04

FRANKIE L. STINSON
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GROUP 1700